

ICMC Awards

ICMC CRYOGENIC MATERIALS AWARD FOR EXCELLENCE 2025



Chiheng Dong

Institute of Electrical Engineering
Chinese Academy of Sciences
China



Simon Otten

Foundation SuperACT
University of Twente
The Netherlands

The ICMC Cryogenic Materials Award for Excellence is awarded annually at the ICMC Conference, subject to the nomination of an appropriate candidate, to an individual, who is under 40 years of age by the application deadline, to “recognize excellence in advancing the knowledge of cryogenic materials over recent years”. The 2025 award was given to Chiheng Dong and Simon Otten. Previous awardees are Fumitake Kametani in 2014, Kazumasa Iida in 2016, Tengming Shen in 2017, Anna Kario and Akiyasu Yamamoto in 2018, Kohei Higashikawa in 2019, Dongliang Wang in 2020, Mark Ainslie in 2021, Shreyas Balachandran in 2023, and Ignacio Aviles Santillana in 2024.

CHIHENG DONG

Chiheng Dong earned his PhD in 2013 in condensed matter physics from the Department of Physics at Zhejiang University. After earning his PhD, he became an Assistant Professor at the Institute of Electrical Engineering, Chinese Academy of Science in Beijing, China where he has risen to the rank of Associate Professor.

Dong’s research focusses on iron-based superconductors (IBS) with a broad range of research topics that are advancing the fundamental understanding of IBS and developing IBS wires and tapes for practical applications. His broad IBS research portfolio includes synthesizing precursor powders, grain boundary engineering, flux pinning, and characterizing the thermal properties of composite IBS wires and tapes.

On the fundamental side, his research on flux pinning and dynamics in IBS tapes was pivotal in understanding and optimizing the performance of these materials. In particular, he enhanced the grain boundary transport properties through overdoping, which contributed to his developing a grain boundary engineering strategy.



On the more practical side, he pioneered a “two-step” method to produce high-quality IBS precursor powder, and successfully scaled up this process to produce kilogram-class production. Dong and his team used this improved powder to produce the world’s first 100-meter-long IBS tapes. Using these long-length tapes, he and his colleagues developed the world’s first pancake and racetrack coils. The pancake coils generated a 1 T magnetic field in a 20 T background field.

Dong’s influence on the field of cryogenic materials is reflected in his strong academic record and community engagement. He has published 86 research papers and has 17 issued patents. He regularly presents his results at major international superconductivity conferences, including ASC, ICMC, EUCAS, and ISS. He has won numerous awards including the 2022 First Prize of Science and Technology Awards, Chinese Materials Research Society and the 2022 First Prize for Technical Invention Award, China Electrotechnical Society.

Citation for Dong’s award: For significant contributions to the fundamental understanding and scale up of iron-based superconductors including fabricating the world’s first 100 m long wire and using it in pancake and racetrack coils.

SIMON OTTEN

Simon Otten earned a PhD in Electrical Engineering from Karlsruhe Institute of Technology in 2019. He moved back to the University of Twente, where he had done his undergraduate and MS studies, as a Postdoctoral Fellow in 2019. In 2023 he joined Foundation SuperACT as a project engineer.

As a PhD student and postdoctoral fellow he studied ReBCO tapes and Roebel cables made from ReBCO tapes. This work was highly relevant for CERN’s R&D program on high field magnets, specifically the development of superconductors and magnet technology for 20+T accelerator-type dipole magnets. The crossing between tapes in Roebel cables turned out to be a major potential failure point during magnet operation, which could become a real showstopper for the Eucard magnet program. Otten made key contributions developing a solution by epoxy-impregnating the cable after coil winding, resulting in a successful testing of a high-field insert.

Otten also investigated ReBCO-CORC type HTS cables for AC and DC applications. This included superconducting links in aircraft and in high field magnets, with a focus on current sharing, stability and AC losses. He was instrumental in creating a better understanding of the factors that drive the AC losses in the CORC[®] cable in the AC bus in ASCEND. He developed a model used to calculate the losses generated by the neighboring cables.

He investigated training in Nb₃Sn cables for use in accelerator magnets, mainly through the so-called standard BOX (BONDing eXperiment) and Compression BOX experiments in close collaboration with PSI-Villigen, CERN, and the University of Twente. He tested the effect impregnants have on training under shear conditions of the cables and under transverse pressure on the same cables using COMPRESSION BOX.

He worked on superconducting power distribution for aircraft propulsion within the ASCEND project with AIRBUS, and projects with GKN-Fokker. This involved superconducting ReBCO coils in systems exposed to high-dynamic mechanical and electro-magnetic loads.

He has more than 20 publications and was recognized as an outstanding young researcher by being selected to give a Young Scientist plenary presentation at the Applied Superconductivity Conference in 2022.

Citation for Otten's award: For significant contributions in understanding bend and transverse compression stresses in Roebel cables and developing an understanding of AC losses in CORC® cables.

ICMC BEST PAPER AWARDS

The ICMC Best Paper Awards provide an incentive for the production and presentation of high-quality papers at the International Cryogenic Materials Conferences and recognition of authors who, in the judgment of the ICMC Board of Directors, presented the best paper at the preceding conference. Papers are nominated by the reviewers.

In 2025, the award for the best paper delivered at the 2023 ICMC in Honolulu, Hawaii, and published in the *IOP Conference Series: Materials Science and Engineering, Vol. 1302, 2024*, was presented at the 2025 Reno conference to the following:

Best Structural Materials Paper

Justin J. Scheidler, Erik J. Stalcup, Thomas F. Tallerico, William Torres,
Kirsten P. Duffy, Tysen T. Mulder

for their paper

“Cryogenic vacuum chamber testing of a conductively-cooled, high temperature superconducting rotor for a 1.4 MW electric machine for aeronautics applications”

Article Number: 012020

ICMC STUDENT MERITORIOUS PAPER AWARD

The ICMC Board of Directors also recognizes students who write high quality papers. All students who applied for and participated in the ICMC Early Registration Fee Waiver program during the 2023 ICMC Honolulu conference were automatically entered for consideration of the ICMC Student Meritorious Paper Award. The papers are ranked on the basis of research merit and quality of writing.

In 2025, the award for the best Student Meritorious papers from the 2023 ICMC Honolulu conference, and published in the *IOP Conference Series: Materials Science and Engineering, Vol. 1302, 2024*, were presented at the 2025 Reno conference to the following:

N Castaneda, G Majkic, C Goel, F C Robles and V Selvamanickam

for their paper

“Scanning Raman Spectroscopy Characterization of 1 Meter Long REBCO Coated Conductor”

Article Number: 012012